



# 8th International Conference on **HIV TREATMENT AND PREVENTION ADHERENCE**

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# Household food aid and nutrition education are associated with improved adherence to HIV antiretroviral therapy: Evidence from Honduras

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# Overview of presentation

- Background and motivation
- Intervention and study design
- Results
- Implications

# Food insecurity and malnutrition associated with poor ART outcomes...

- Food insecurity is the limited or uncertain availability of nutritionally adequate, safe foods
- Key barrier to adherence and retention in care
- Associated with poorer HIV biologic outcomes (immune response, viral suppression)
  - Low adherence may be one pathway

# ...prompting increasing support for nutritional interventions for PLHIV

- Individual or household food aid identified as a strategy to improve adherence (Bärnighausen et al, 2011; Thompson et al, 2012 – IAPAC)
- WHO recommends nutritional assessment, and dietary counseling, education and support, including food aid when appropriate, be a standard part of comprehensive care for HIV

# Empirical evidence on effectiveness of food-based interventions for PLHIV is still limited

- Few studies on household food aid and ART adherence
  - Zambia <sup>1</sup>, Mozambique <sup>2</sup>, Niger <sup>3</sup>
  - No studies in Latin America
- We tested the effect of household food aid and nutritional education on adherence in Honduras



<sup>1</sup> Cantrell et al (2008), Tirivayi et al (2012); <sup>2</sup> Posse et al (2013); <sup>3</sup> Serrano et al (2010)

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# Collaborative study with multiple stakeholders

- RAND Corporation
- UN World Food Program – Office of Latin America and the Caribbean
- Honduran Ministry of Health
- Association of People Living with HIV/AIDS in Honduras (ASONAPVSI DAH)

# Formative research in 2008 led to intervention components

- Identified frequently consumed and culturally salient foods
- Collected contextual information about food consumption, availability, and prices
- Assessed nutritional status, micro and macro-nutrient intake, food security, and barriers to adherence

# Pilot intervention compared food aid plus nutritional education to nutritional education only

	<b><u>Intervention</u></b> <b>Food aid + nutritional education</b> <b>(n=203)</b>	<b><u>Control</u></b> <b>Nutritional education only</b> <b>(n=197)</b>
<b>Region 1: Tegucigalpa</b>	Clinic 1 (Large) <ul style="list-style-type: none"><li>• n = 131</li></ul>	Clinic 2 (Large) <ul style="list-style-type: none"><li>• n = 128</li></ul>
<b>Region 2: Caribbean</b>	Clinic 3 (Small) <ul style="list-style-type: none"><li>• n = 72</li></ul>	Clinic 4 (Small) <ul style="list-style-type: none"><li>• n = 69</li></ul>

# Hypotheses

- Information-Motivation-Behavioral Skills (IMB) Model → nutrition education should improve ART adherence
- Household food aid should additionally improve adherence by easing household resource constraints

# Nutritional education



- Led by trained nutritionists
- Monthly 1-on-1 counseling sessions
- Monthly group education sessions

# Household food aid

- Supplemental household ration, standardized for family of 5
- Monthly pick-up
- Contents follow WFP policies: maize, rice, beans, corn-soy blend, vegetable oil



# Study participants

- Inclusion criteria
  - 18 years or older and local resident
  - Receiving ART for at least 6 months with indications of suboptimal adherence
  - Underweight and/or with household food insecurity

# Multiple measures for adherence assessed at baseline, 6 and 12 months

- Two objective measures:
  - Delayed pharmacy refill of ARVs in last 6 months (binary)
  - Missed scheduled clinic appointment in last 6 months (binary)
- One self-reported measure:
  - Missed ARV doses in the past month (binary)



# Analysis

- Outcome variables → 3 measures of adherence
- Linear probability model, adjusted for potential confounders
- Generalized estimating equations for correlated repeated measurements
- Attrition weights

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# Participants characteristics

- 400 participants recruited at baseline
- Most were women (69%); moderately or severely food insecure (84%); one-third were overweight or obese
- Groups differed on SES variables
- 82% of participants completed study

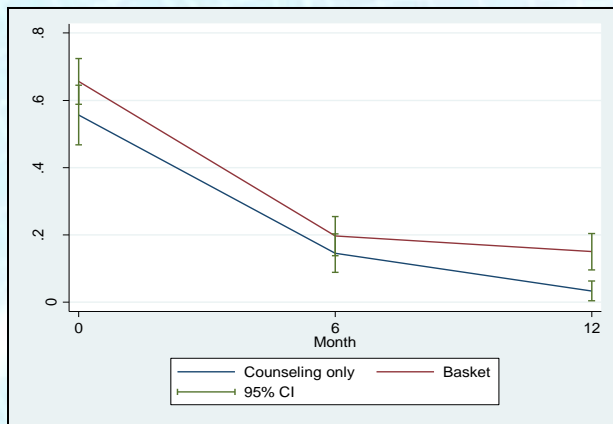
# Baseline adherence differed between groups

	<b>Food basket + Nutrition education (n=203)</b>	<b>Nutrition education only (n=197)</b>	<b>All (n=400)</b>
<b>Missed appointment, %</b>	65.2‡	55.9‡	60.6
<b>Delayed pharmacy refills, %</b>	63.8**	36.4**	50.4
<b>Missed ART doses %</b>	41.0	45.4	43.0

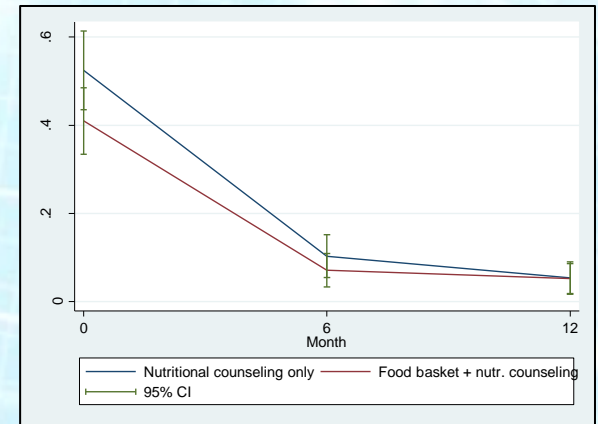
\*\* p < 0.01; \* p < 0.05;

‡ p < 0.10

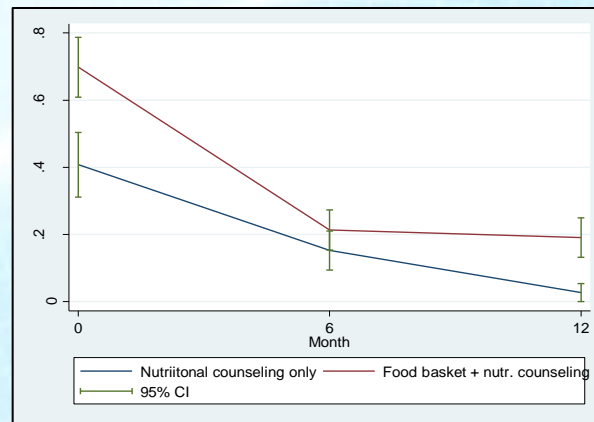
# Unadjusted trends suggest improved adherence for both study groups



Missed appointments



Self-reported missed doses



Delayed pharmacy refills



# Food basket associated with improved pharmacy refills only

	<b>Missed appointment</b>	<b>Delayed pharmacy refills</b>	<b>Self-reported missed doses</b>
	Coef (SE)	Coef (SE)	Coef (SE)
<b>Month 6</b>	-0.380**	-0.221**	-0.344**
	(0.044)	(0.048)	(0.053)
<b>Month 12</b>	-0.504**	-0.325**	-0.414**
	(0.039)	(0.040)	(0.047)
<b>Food basket X Month 6</b>	-0.046	-0.196**	0.005
	(0.060)	(0.062)	(0.066)
<b>Food basket X Month 12</b>	0.012	-0.111‡	0.050
	(0.060)	(0.059)	(0.063)

\*\* p < 0.01; \* p < 0.05; ‡ p < 0.10

Covariates: Receipt of food basket, age, gender, education, work status, presence of HIV symptoms, presence of children under age 18 in HH, food insecurity, body mass index, economic support from family/friends, depression, and month-of-interview indicators to control for seasonality



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# Food aid may have positive - but limited - effects on adherence

- Group receiving food aid plus nutrition education had a 20% larger reduction in pharmacy refill delays than the group receiving nutrition education only
- No additional effect of food aid on probability of missed appointments or self-reported missed doses



# Nutritional education may improve adherence but needs to be formally tested

- All three indicators of adherence improved significantly among both groups receiving nutritional education
- Unlike food aid, the nutritional education was closely tailored to the local culture and food environment

# Our results should be taken as preliminary

- Small number of clinics
  - Limited ability to account for correlation between individuals in clinics
  - Randomization did not produce statistically comparable groups. May have omitted variables bias
- Outcome measures capture treatment adherence broadly, but are not direct measures of medication adherence

# Few interventions address structural barriers to adherence and HIV outcomes in Latin America

- Latin America has a unique context:
  - Low HIV prevalence, concentrated in marginalized groups
  - Extremely high social and economic inequality
  - High prevalence of overweight and obesity coinciding with food insecurity
- We provide context specific evidence that nutritional interventions can improve adherence in this setting, but more needs to be done



# Optimal food security interventions for PLHIV still need to be determined

- Sustainability of direct food aid is an issue
  - Determine timing, targeting, and contents to assist people in most need
- Consider alternate modalities (e.g. cash, vouchers)
- Consider interventions to address upstream causes of food insecurity (e.g. income generation, social protection policies, etc )

Thank you!

